# Nanoagents Locomotion And Compute Apparatus Gallery

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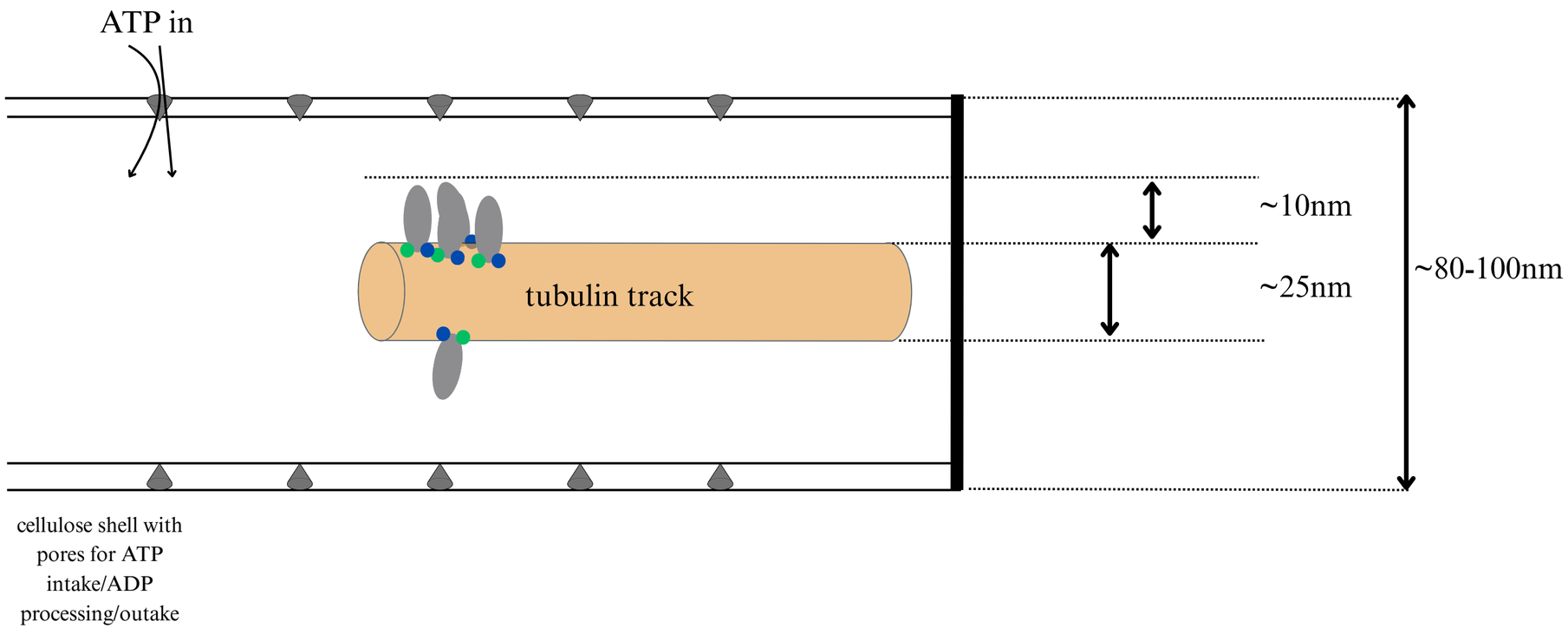
# Nanomotors/signal generators



# Legged motion

## Step motion

1

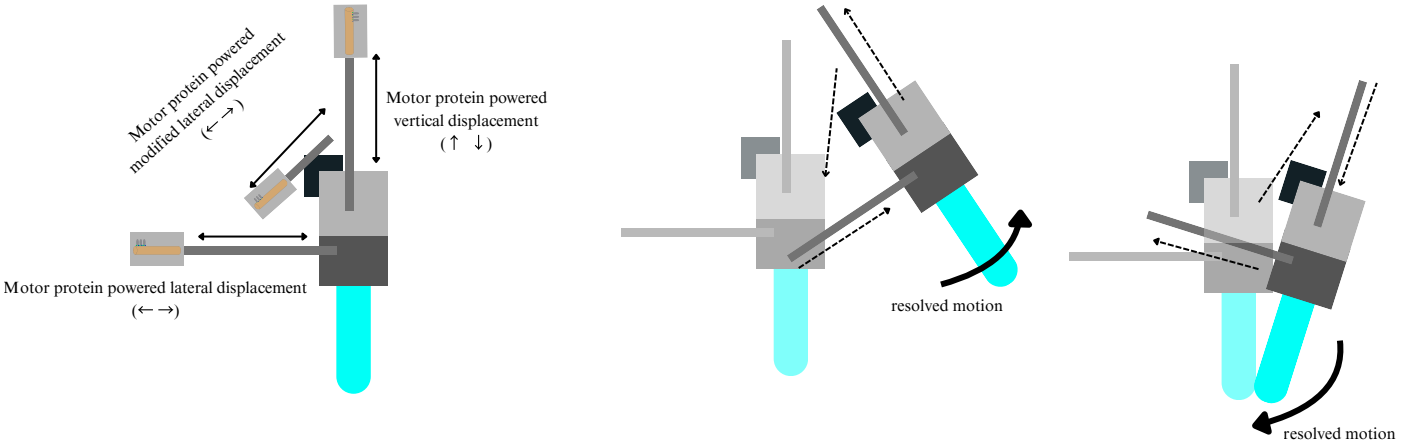
Leg at rest

2

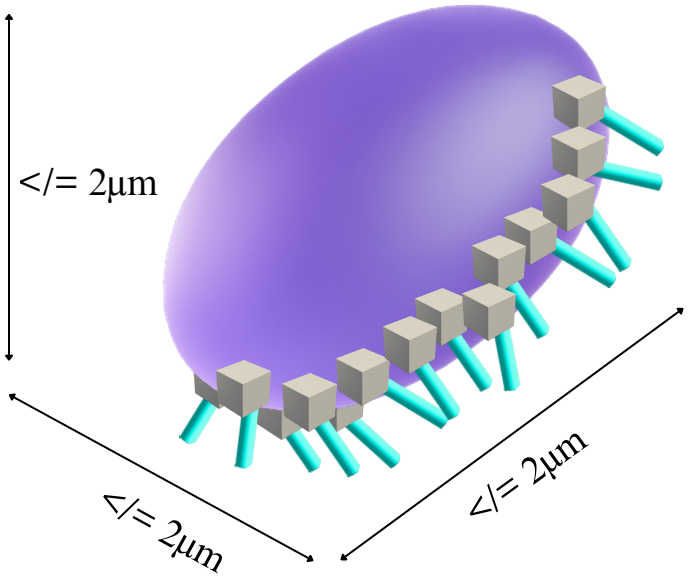
Up step

3

Down step




## Artistic rendition

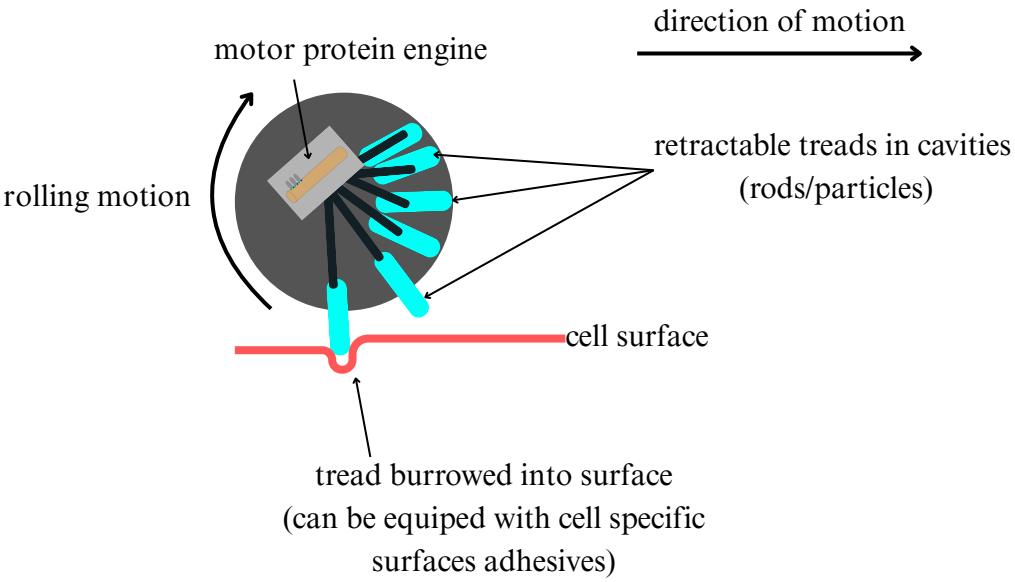



## Biological analogue

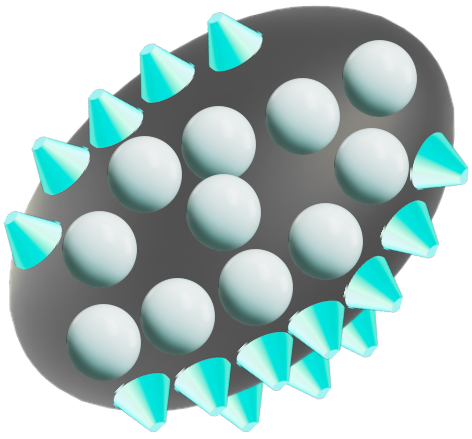
Amoeba using pseudopodia for locomotion
(https://en.wikipedia.org/wiki/Pseudopodia)

# Tank tread locomotion

## Treading motion

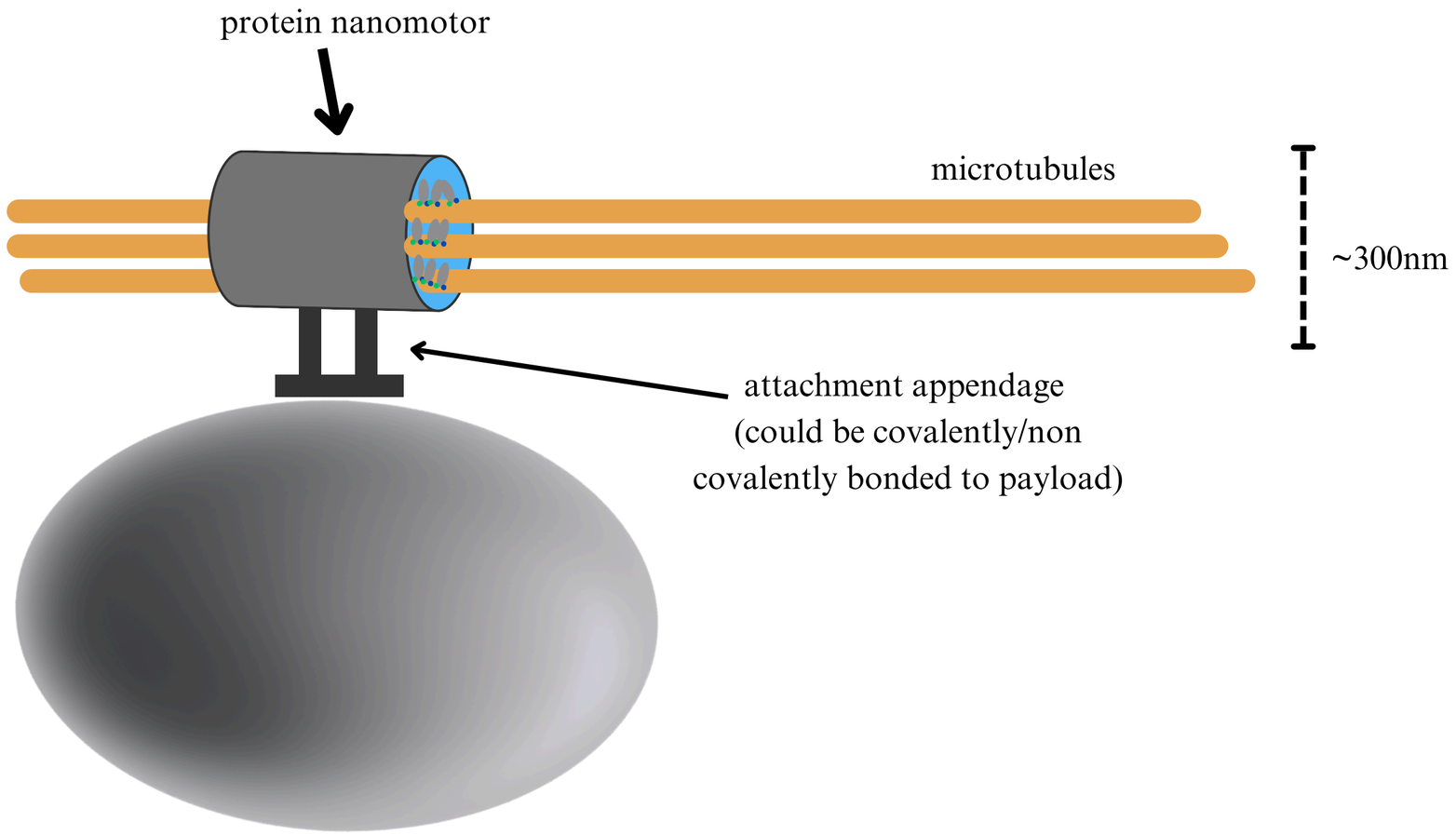



## Artistic rendition

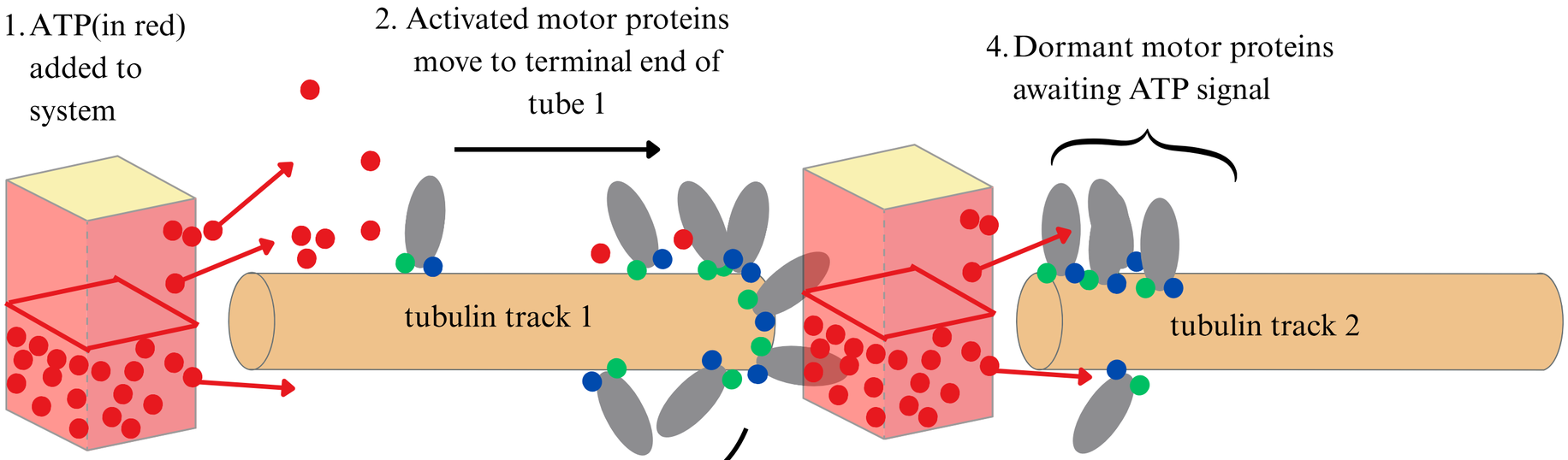


See Freitas, Nanomedicine Chapter 9***

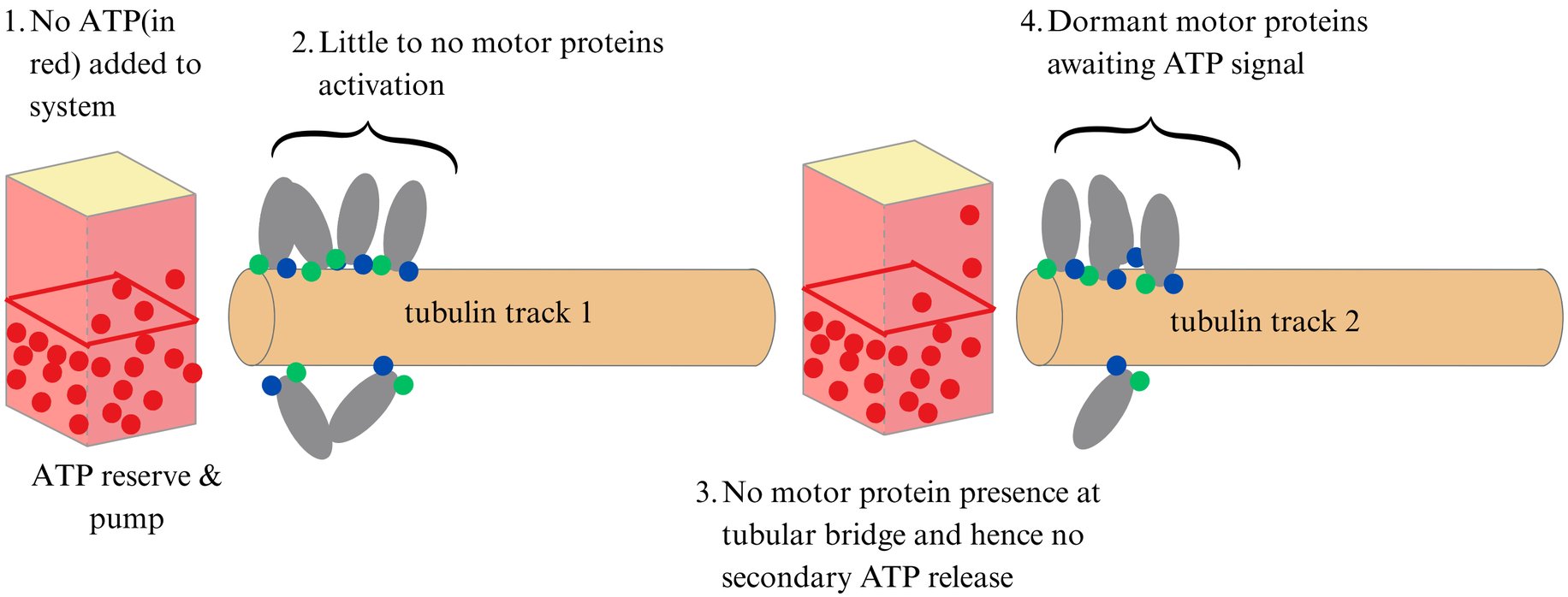
# Microtubule based locomotion



# Molecular Switch in “ON” State


1. ATP(in red) added to system
2. Activated motor proteins move to terminal end of tube 1
4. Dormant motor proteins awaiting ATP signal
tubulin track 1
tubulin track 2
ATP reserve & pump
Motor proteins are recycled
3. Motor protein presence activates ATP release for second tubulin track and propagating signal continues
Activation is by opening of nanopore?

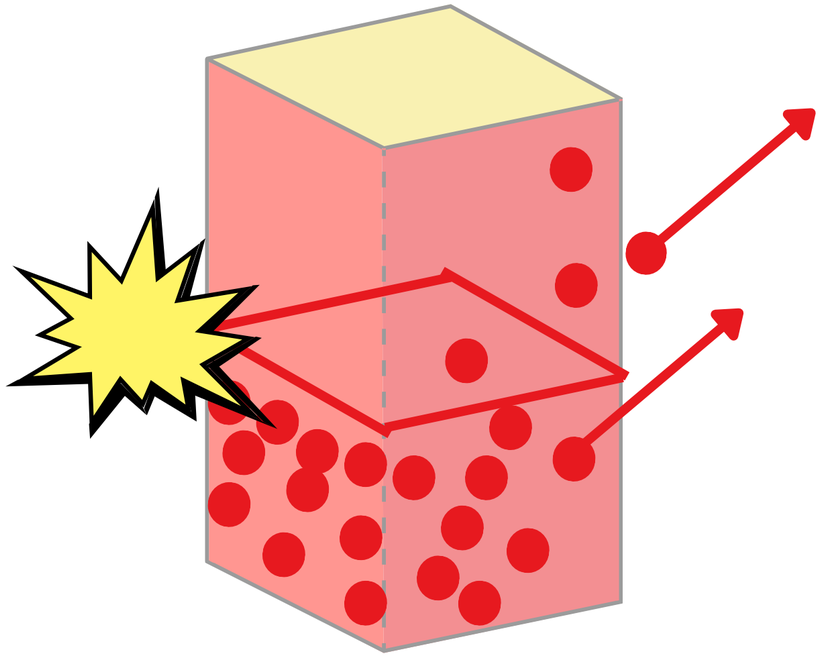
# Molecular Switch in “OFF” State


1. No ATP(in red) added to system
2. Little to no motor proteins activation
4. Dormant motor proteins awaiting ATP signal
tubulin track 1
tubulin track 2
ATP reserve & pump
3. No motor protein presence at tubular bridge and hence no secondary ATP release

# ATP store and release mechanism

1. motor proteins inducing **mechanical stress on ATP reserve along specificly engineered plane**

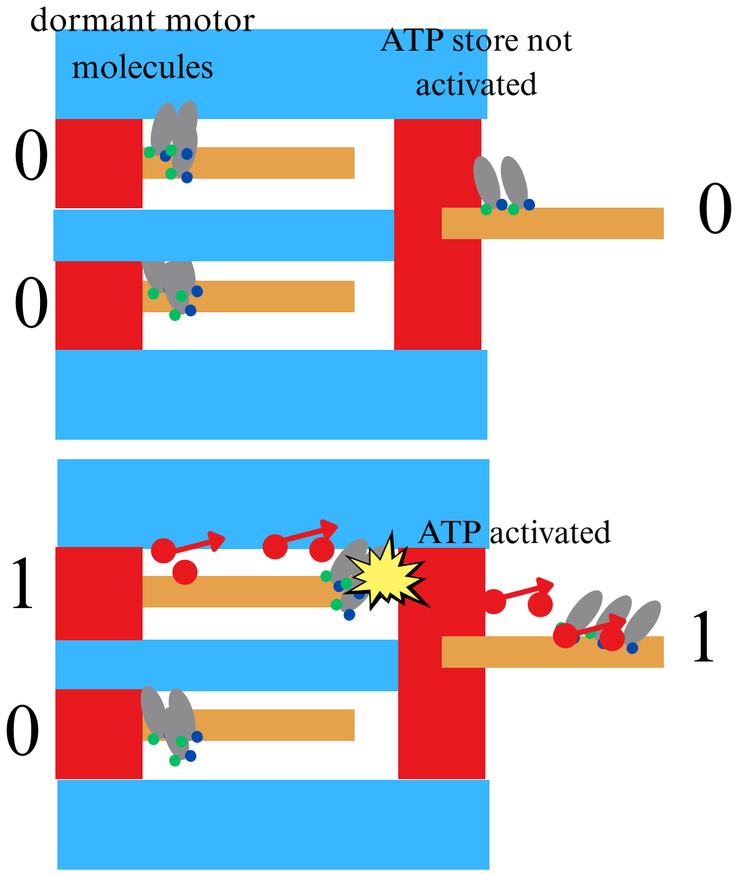
ATP reserve

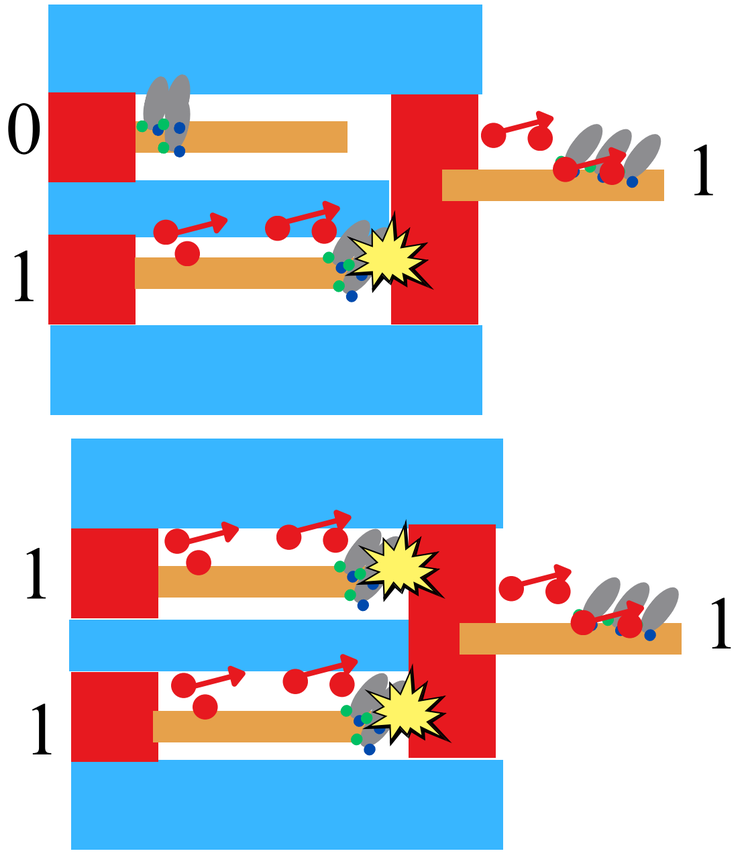


3. ATP released into cavity

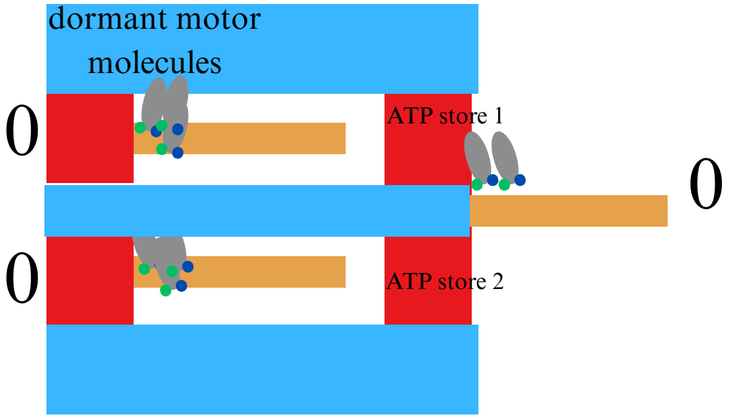
2. Stress along malleable plane causes tank to give up some ATP molecules in its reserve (like squeezing juice out of a juicebox)

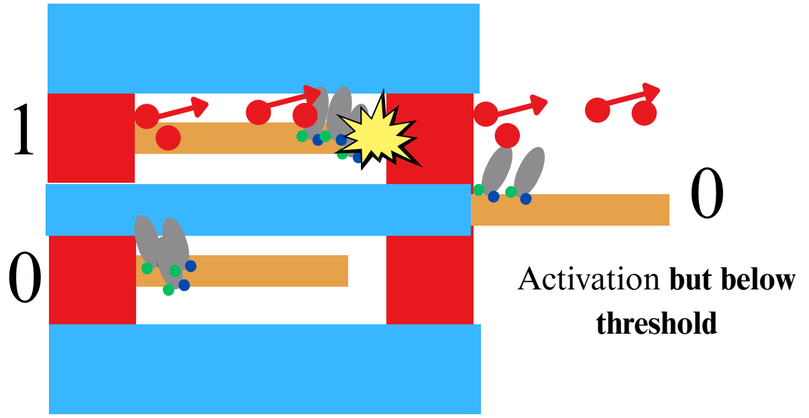
# **OR gate** using motor proteins and tubulin tracks

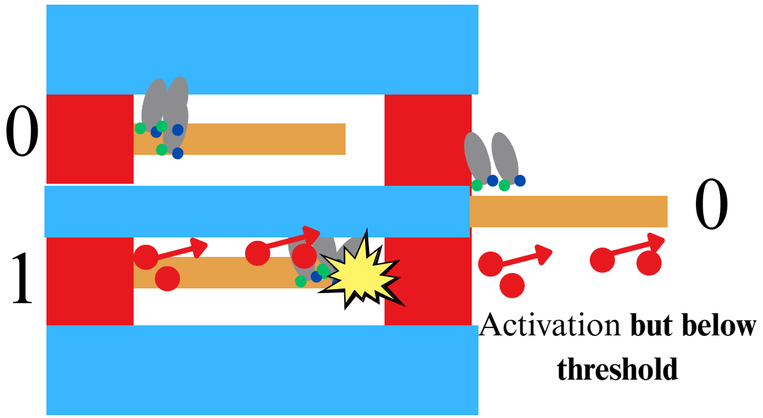


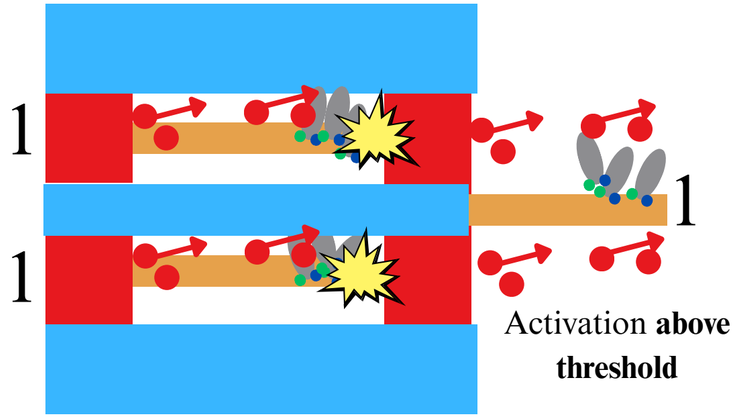



# **AND gate** using motor proteins and tubulin tracks

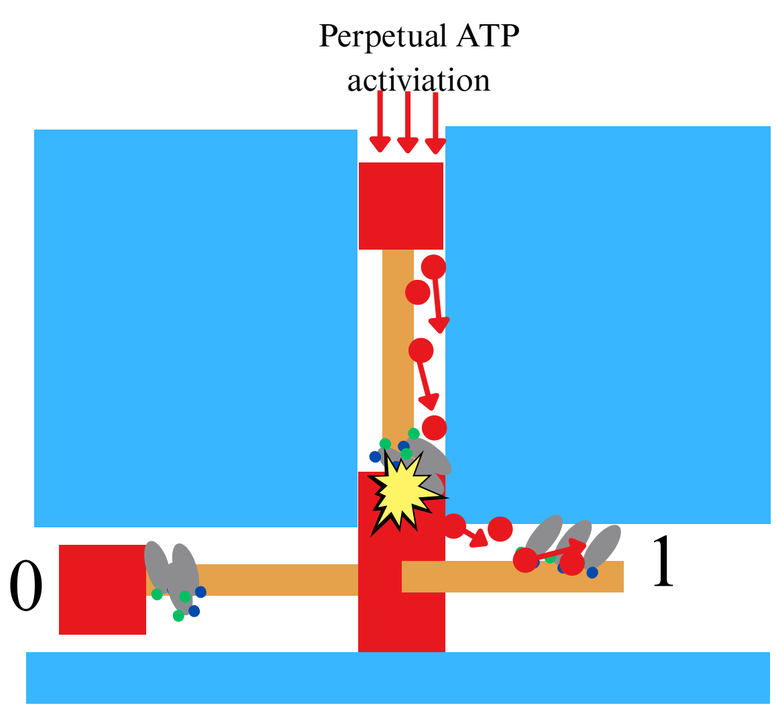


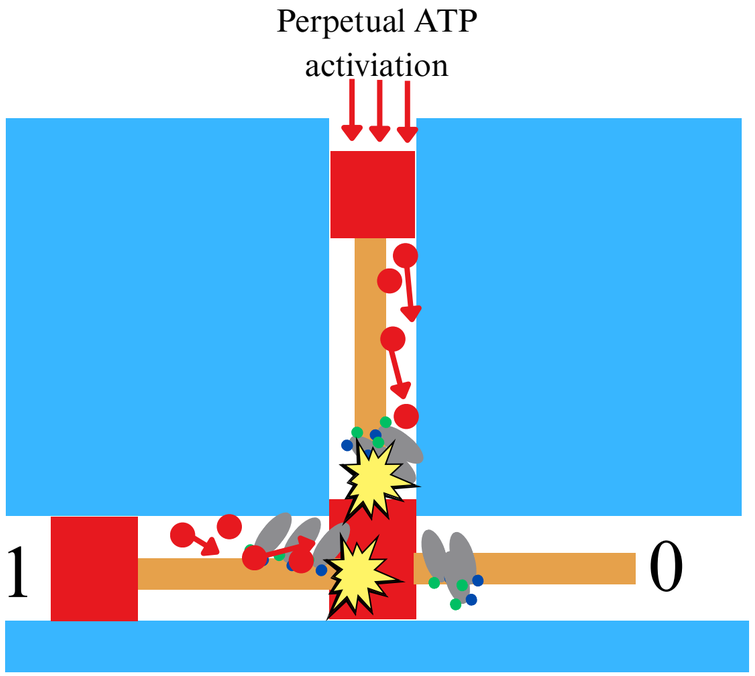



# **NOT gate** using motor proteins and tubulin tracks




motor protein activity
temporarily deforms/closes
ATP release aparatus